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## (54) Gaming and amusement machines

(57) A gaming or amusement machine has a display means comprising one or more reels (7) which are movable relative to a display location to bring a region (16') of each reel (7) into register with the display location. Bodies with multiple facets (16) having a plurality of symbols are carried by each reel (7) into register with the display location. The bodies (16) are movable relative to the reels (7) so that each body can present a selected one of its symbols into view at the display location. It is thus possible to increase the number of symbols which a reel of a gaming machine can display while maintaining the clarity of its display.

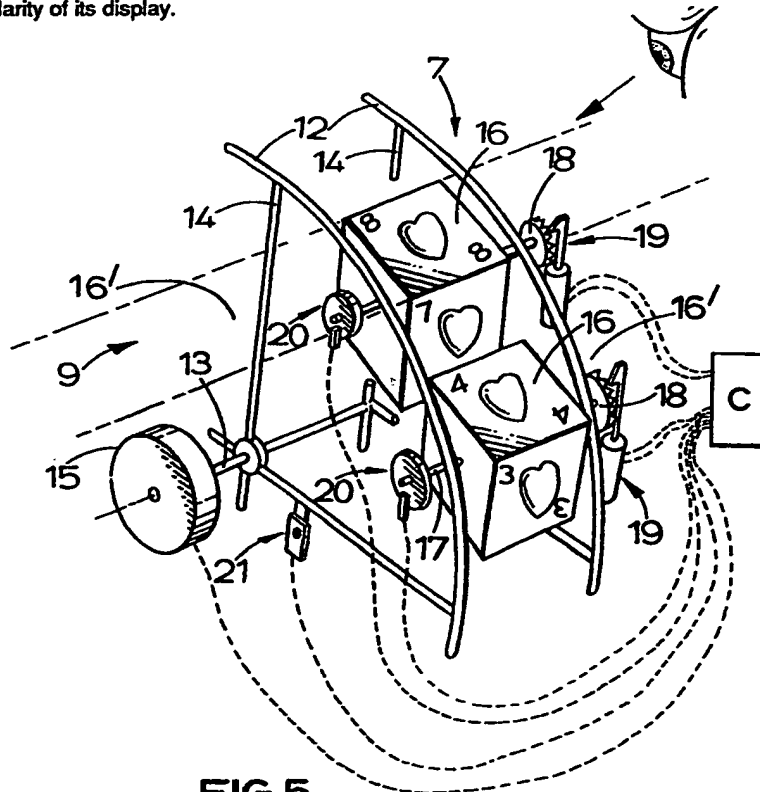


FIG. 5.

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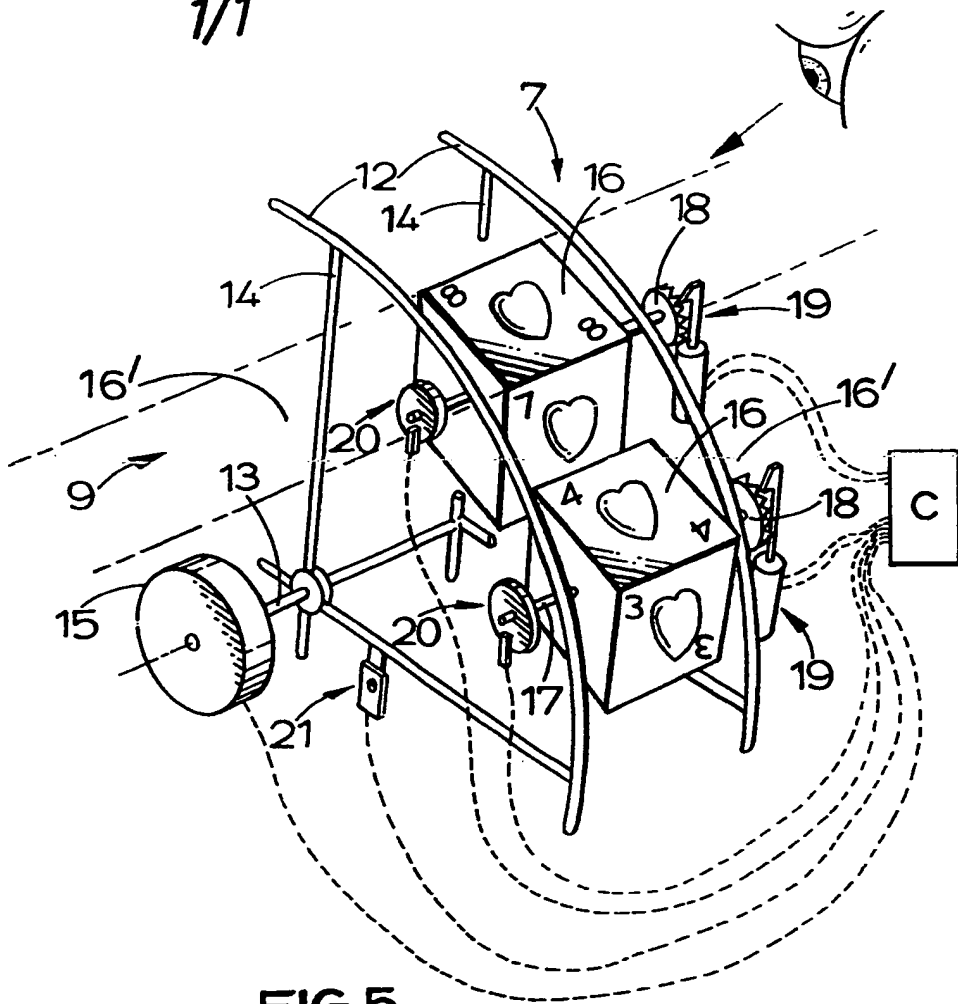


FIG. 5.

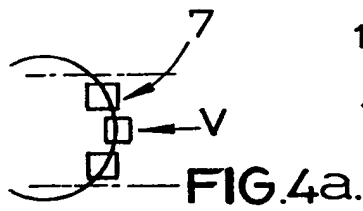


FIG. 4a.

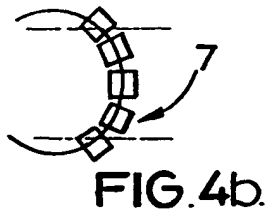


FIG. 4b.

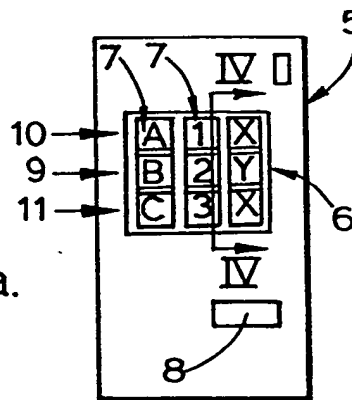


FIG. 3.

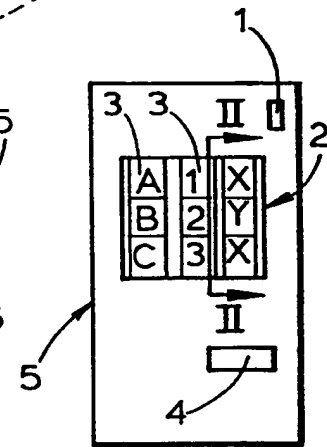


FIG. 1.

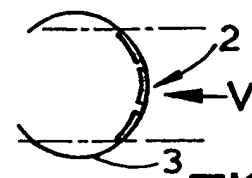


FIG. 2.

GAMING AND AMUSEMENT MACHINES

This invention relates to gaming or amusement-with-prizes machines of the kind generally known as 'fruit machines', in which usually three, or sometimes more or less, reels carrying symbols are set in rotation and then stop in turn at random intervals and if the resulting combination of symbols on the three reels appearing on a given line in the display, the 'win line', is one which has been designated a winning combination, the player receives an award or a credit. Instead of actual reels, it is known to use other forms of display which simulate rotating reels to a greater or lesser degree, for example the Panascope, or a video screen on which images of the symbols appear. It is also known, for example in some German machines, to use rotating discs instead of actual reels. Such machines will hereinafter be referred to as of the kind set forth.

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Many special features are provided nowadays in fruit machines, indeed they have to some extent taken over from the basic game, in that most of the bigger wins are obtained by the features rather than by the initial result when the reels first come to a halt. In a so called 'ladder' or 'trail' feature, steps in the ladder or trail may be illuminated as a result of certain symbols, e.g. symbols bearing superimposed numbers, appearing on the win line. When the 'ladder' or 'trail' is completed, a jackpot prize or another feature which may result in a jackpot prize may be awarded.

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On certain occasions after a non-winning game, determined for example at random or when a particular symbol such as a "?" appears on the win line, a so

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called 'skill stop' or 'pseudo skill stop' feature may be provided to assist completion of a ladder or trail. In a 'skill stop' or 'pseudo skill stop' feature steps in the 'ladder' or 'trail' are illuminated either sequentially along the 'ladder' or 'trail' or for a brief period of time at random positions in the 'ladder' or 'trail' and the player attempts to stop the feature by performing a 'skill stop' operation at the instant when the end step of the 'ladder' or 'trail' is illuminated. In a 'pseudo skill stop' feature the machine itself determines whether or not the end step of the 'ladder' or 'trail' is illuminated, although it appears to the player that the instant the 'skill stop' operation is performed determines whether or not the trail is completed.

Amongst the many special features which are provided nowadays in fruit machines, one which has proved popular is the so-called 'nudge' feature, by which the player is sometimes given the opportunity at the end of a game which did not result in a win, to advance one or more of the reels by a single step, or sometimes more than one step, to bring a fresh symbol onto the win line and thereby change what was a losing combination into a winning one. This feature may be offered apparently at random after a non-winning game, or a number of 'nudges' determined in one of a variety of ways may be awarded as a special feature after completion of a 'ladder' or 'trail'.

It is common practice to display the fruit symbols around the periphery of a rotating reel, commonly a drum reel. The "feature" symbols such as "nudge" symbols, "skillstop" symbols, and "trail point" symbols either take the place of some of the fruit symbols or share the same location at the periphery of the reel.

The size and number of symbols which can be displayed on a reel is restricted by the size of the reel drum. Some of the more sophisticated games require a larger number of symbols than is standard which results in either providing special large drums for use in special fruit machine carcasses (which is not desirable economically) or the individual symbols being smaller and more closely spaced in order to fit into a standard reel (this too can be undesirable if the symbols are so small as to be appreciably less distinctive than normal symbols, and therefore less attractive to the user).

Many different kinds of typical fruit machines use a reel drum of substantially the same size and can accommodate a maximum number of symbols at the periphery of the reel drum which is of the order of 25 symbols.

An aim of the invention is to increase the number of symbols which a reel of a gaming or amusement machine can display without unduly comprising the size of the symbols. This allows us to maintain the attractiveness of our displays whilst at the same time playing games which need a lot of symbols.

According to a first aspect the invention comprises a gaming or amusement machine having a display location and display means provided with a plurality of symbols a selected one of which can be displayed at the display location, and in which the display means comprises first movable means which has a plurality of display regions and is movable relative to the display location to bring a selected one of the display regions into register with the display location, and second movable means carried by the first movable means and having a plurality of symbols and

being movable relative to the first movable means and the display location so as to present a selected one of its symbols into view at the display location, the second movable means being capable of displaying different symbols at the display location with the first movable means in a single position relative to the display location.

This enables the overall symbol-presenting capacity of the machine to be increased by the additional number of symbols which the second movable means can present to the display location.

Symbols may be provided at the other display regions, or second, third or further second movable means may be provided at some or all of the display regions. The second movable means are preferably at the periphery of the first movable means. Preferably the first movable means comprises a reel.

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The first movable means may comprise a support ring having a transverse support spur upon which second movable means is movably mounted. A second support ring may be provided axially spaced from the first support ring, with the second movable means connected to each support ring by transverse support spurs. The transverse support spurs may comprise a common axle about which the second movable means is angularly movable.

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The second movable means may comprise a multi-faceted body, such as a polygon, cylinder, or tube, and may even comprise a two-sided sheet or plate.

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Preferably the second movable means is hollow and may be made from sheet material. Each second movable means is preferably provided with driven means which co-operates with drive means adapted to move the second movable means relative to the first movable means. Sensors may be provided to enable a controller of the machine to know what display region, or regions, is adjacent to the display location and what symbol of the second movable means is presented at the display location - for viewing.

Preferably the first movable means comprises a rotatable reel having a plurality of display regions at its peripheral edge and the second movable means may be rotatable about an axis fixed to the first movable means and generally parallel with the axis of rotation of the reel. The "reel" and/or second movable means may comprise a cone. The axis about which the second movable means may rotate may not be parallel to the axis of the reel.

When two or more second movable means with multiple facets which are flat, such as cubes, are adjacent to each other the invention allows us to present to the display location each of the flat symbol - carrying facets in planes which are substantially parallel to each other so that the surface carrying the symbol is not curving away from the viewer.

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According to a second aspect of the invention we provide a reel assembly for use in a machine in accordance with the first aspect of the invention.

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According to a third aspect the invention comprises a method of increasing the number of symbols

which can be displayed at a display location of a gaming or amusement machine comprising arranging for first movable means to carry second movable means, providing the second movable means with a plurality of symbols movable relative to the first movable means and the display location whereby the second movable means can present a selected symbol from a variety of different symbols for viewing at the display location when the first movable means is in a position such as to register the second movable means with the display location.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings of which:-

Figure 1 shows schematically a known gaming or amusement machine;

Figure 2 is a schematic cross-section on line II-II of Figure 1;

Figure 3 shows schematically a gaming or amusement machine in accordance with the present invention;

Figures 4a and 4b are alternative schematic cross-sections on line IV-IV of Figure 3; and

Figure 5 schematically illustrates details of the embodiment of Figure 3 and shows the principle of the invention.

An example of a prior art gaming or amusement (fruit) machine is shown in Figures 1 and 2 and has a coin or token input point 1, a display screen 2 at



which three reels 3 are visible. A central win line and upper and lower horizontal lines adjacent the win line can be seen. A payout tray 4 is also provided at which coins or tokens are paid out if a winning combination of symbols is present in the display screen 2. Each reel 3 has a series of symbols at its cylindrically curving peripheral edge. When a user looks at the display screen 2 along viewing line V (as shown in Figure 2) the symbols of the upper and lower lines to either side of the win line curve away from him.

The principle of the gaming or amusement machine 5 of Figure 3 is best illustrated with reference to Figure 5. The machine 5 has a coin or token input slot, a display screen 6, or location, at which three reels 7 can be seen an electronic controller C, and a payout tray 8. A win line 9 is visible at the centre of the screen with upper and lower adjacent lines 10 and 11 also being visible. Its reels 7 are similar and only one will be described in detail.

Each reel 7 comprises a pair of axially spaced rings 12 connected to an axle 13 by radial spokes 14. The axle 13 is driven by a stepper motor 15. A series of hollow plastic cubes 16 are pivotally connected to the periphery of the reel 7 at angularly spaced display, or primary index, regions 16' by transverse axles 17 mounting the cubes 16 on the rings 12. The axles 17 are generally parallel to the axle 13 and carry a driven component 18, such as a toothed wheel, which co-operates with driving means 19 provided on the machine when the cubes 16 are visible in the display screen 6. Three tooth-and-pawl driving means 19 are provided: one at each of the win line 9, upper line 10, and lower line 11. Each cube 16 is provided

with a sensor 20 so that its orientation relative to the display screen 6 can be detected. Signals from the sensor 20 are fed to the controller C. The rotational position of the rings 12 (and hence the display regions 16') is detected by a sensor 21 and signals indicative of that position fed to the controller C. Each cube 16 has a component of the sensors 20 which co-operates with a stationary sensor component provided at a fixed position in the body or carcass of the machine. When the reel 7 stops the two components of the sensor 20 co-operate to indicate the orientation of the cube 16 in the win line. Similarly, the sensors 21 comprise a moving part and a fixed part. The sensors 20 and 21 may be opto-electronic sensors, or any other suitable kind.

Sensors 20 are provided for the win line 9 and the upper and lower lines 10 and 11, and driving means 19 are provided for the win, upper and lower lines. Only the win and lower adjacent lines are shown in Figure 5.

Each of the cubes 16 comprises second movable means, whilst the rings 12 and spokes 14 comprise first movable means. The cubes 16 each carry a symbol on each of their four faces which can be presented to the viewing screen 6. In the example shown the symbols are representations of playing cards, one cube 16 shown in Figure 5 has the ace, two, three and four of hearts and the other the five, six, seven and eight of hearts. The other cubes on the reel may carry other "cards" in the suit of hearts, or they may carry other fruit symbols, or other playing card representations. Each reel 7 may have a single suit of "cards" on its cubes, in which case four reels may be desirable.

When the machine is played by a user the reels spin (the rings 12 are driven around by motor 15) and come to rest. The cubes 16 then visible in the display screen 6 are then driven by drive means 19 to rotate and eventually stop in final positions showing the final display of symbols which the user has achieved. The final display of symbols is under the control of the controller C which is normally arranged to generate the symbols in a random or pseudo-random manner, as is common in the art.

It will be appreciated that the cubes 16 could spin first and then the rings 12, or if a different drive system for the cubes were provided both could rotate together.

In the example shown in Figures 3 to 5 the machine has twelve display regions, or primary index positions, on the rings 12 and four symbol-carrying faces on each, secondary, rotating cube, giving a total of thirty-six symbols. A four reel machine with a separate suit on each reel could then display forty-eight of the fifty-two cards of a pack of playing cards. A thirteen primary index position (display region) reel could show an entire suit of cards.

Figure 4a shows one way in which the machine can present its symbols at the display screen 6, with each of the "front-facing" symbols provided on flat surfaces which lie in parallel planes. This avoids the perspective foreshortening illustrated in Figures 1 and 2 and can be arranged to deter a user from straining to look around the curve of a conventional reel to see what are the symbols next to the upper and lower lines. With this distraction removed players may play the game more quickly.

On the other hand it may be felt that it is a part of the entertainment of existing machines to tantalise the player with a glimpse of symbols beyond the upper and lower lines and it may be desirable to keep this feature. Figure 4b shows the "front" faces of the cubes 16 aligned tangentially to the circle upon which their axles 17 lie. A machine may be capable of switching between the two displays of figures 4a and 4b.

It will be appreciated that there may be a different number of primary index positions, 16 or 24 being also preferred; the drives for the first and second movable members could be any convenient means such as friction drive or direct magnetic interactive drive; the complete reel mechanism assembly could consist of differing numbers of individual modules mounted vertically or horizontally or in any spatial configuration as appropriate; the symbols displayed on the second movable means could be embossed or formed in relief as disclosed in our patent application GB 8918448.5; and means could be provided to illuminate the display symbols from within the inner display member, for example by passing a current along the central axles 17. A reel in accordance with the invention may comprise one or more flat panels as the second movable means. If a rotatable (or flipable) flat panel is provided at each display region the reel may be capable of displaying two entirely separate sets of symbols if all of the panels are flipped over at the same time. Such a reel would not at first glance appear very different from a conventional reel.

The symbols on different faces of the second movable bodies may be for use in different special game features.

In a possible alternative embodiment we provide a set of 2-dimensional second display elements having symbols on each side and set around the periphery of a "reel" by means of secondary axles. The set of second  
5 display elements are all flipped over to present one side or the other to a viewing station by a single, flipping, actuation mechanism.

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CLAIMS

1. A gaming or amusement machine having a display location and display means provided with a plurality of symbols a selected one of which can be displayed at the display location, and in which the display means comprises first movable means which has a plurality of display regions and is movable relative to the display location to bring a selected one of the display regions into register with the display location, and second movable means carried by the first movable means and having a plurality of symbols and being movable relative to the first movable means and the display location so as to present a selected one of its symbols into view at the display location, the second movable means being capable of displaying different symbols at the display location with the first movable means in a single position relative to the display location.
2. A machine according to claim 1 in which symbols are provided at the other display regions.
3. A machine according to claim 1 or claim 2 in which second, third or further second movable means are provided at some or all of the display regions.
4. A machine according to any preceding claim in which the second movable means are at the periphery of the first movable means.
5. A machine according to any preceding claim in which the first movable means comprises a reel.
6. A machine according to any preceding claim in which the first movable means comprises a support ring

having a transverse support spur upon which second movable means is movably mounted.

5 7. A machine according to claim 6 in which a second support ring is provided axially spaced from the first support ring with the second movable means connected to each support ring by transverse support spurs.

10 8. A machine according to claim 7 in which the transverse support spurs comprise an axle about which the second movable means is angularly movable.

15 9. A machine according to any preceding claim in which the second movable means comprises a multi-faceted body.

20 10. A machine according to any preceding claim in which the second movable means is hollow and made from sheet material.

25 11. A machine according to any preceding claim in which each second movable means is provided with driven means which co-operates with drive means adapted to move the second movable means relative to the first movable means.

30 12. A machine according to any preceding claim in which sensors are provided to enable a controller of the machine to know what display region, or regions, is adjacent to the display location and what symbol of the second movable means is presented at the display location.

35 13. A machine according to any preceding claim in which the first movable means comprises a rotatable reel having a plurality of display regions at its

peripheral edge and the second movable means is rotatable about an axis fixed to the first movable means and generally parallel with the axis of rotation of the reel.

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14. A machine according to claim 13 in which the reel and/or second movable means comprise a cone.

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15. A machine according to claim 13 or claim 14 in which the axis about which the second movable means rotates is not parallel to the axis of the reel.

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16. A machine according to any preceding claim in which the second movable means comprise bodies with multiple facets which carry symbols.

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17. A machine according to claim 16 in which two or more bodies located in a display region of the machine present each of the flat symbol-carrying facets in planes which are substantially parallel to each other so that the surface carrying the symbol is not curving away from the viewer.

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18. A gaming or amusement machine substantially as described and illustrated herein with reference to Figures 3 to 5 of the accompanying drawings.

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19. A reel for a gaming or amusement machine in accordance with any one of claims 1 to 18, the reel comprising first movable means which has a plurality of display regions and which in use is movable relative to a display location of the machine in which it is to be used so as to bring a selected one of the display regions into register with the display location, and second movable means carried by the first movable means and having a plurality of symbols and being movable

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relative to the first movable means so as to present in use a selected one of its symbols into view at the display location, the second movable means being capable of displaying different symbols at the display location with the first movable means in a single position relative to the display location.

20. A reel assembly substantially as described and illustrated herein with reference to Figures 3 to 5 of the accompanying drawings.

21. A method of increasing the number of symbols which can be displayed at a display location of a gaming or amusement machine comprising arranging for first movable means to carry second movable means, providing the second movable means with a plurality of symbols movable relative to the first movable means and the display location whereby the second movable means can present a selected symbol from a variety of different symbols for viewing at the display location when the first movable means is in a position such as to register the second movable means with the display location.

22. A method of increasing the number of symbols which can be displayed at a display location of a gaming or amusement machine substantially as described herein.

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**Patents Act 1977****Examiner's report to the Comptroller under  
Section 17 (The Search Report)**

- 16 -

Application number

9203903.1

**Relevant Technical fields**

(i) UK CI (Edition K ) G4V (VAA V118 VJJ)

(ii) Int CL (Edition 5 ) G07F 17/34

Search Examiner

G NICHOLLS

**Databases (see over)**

(i) UK Patent Office

(ii)

Date of Search

15 MAY 1992

Documents considered relevant following a search in respect of claims

1-22

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Category	Identity of document and relevant passages	Relevant to claim(s)

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